

# EXHIBIT 11

# Printed Circuit Boards

DESIGN, FABRICATION,  
AND ASSEMBLY

- ✓ High density interconnects
- ✓ CAD/CAM techniques
- ✓ Laminates
- ✓ Soldering

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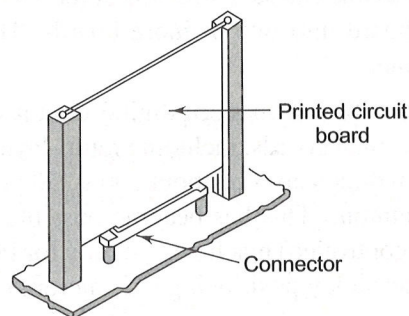
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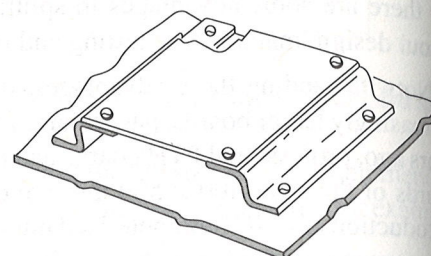


### 3.3.3 Board Guiding and Retaining

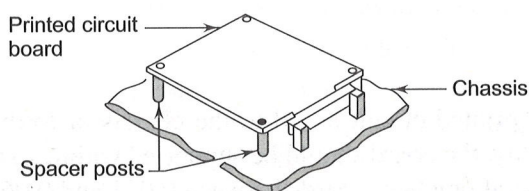
The most convenient method for use with plug-in printed circuit assemblies is that of card guides. They provide a quick connect/disconnect capability with the convenience of testing the board out of the units by means of extender cards. The type of card guide depends upon the shape of the board and the degree of accuracy needed to ensure proper mating alignment. Some of the commonly used card guides are shown in Figure 3.3. There must be sufficient area to allow room for the card guide along the edge of the board.



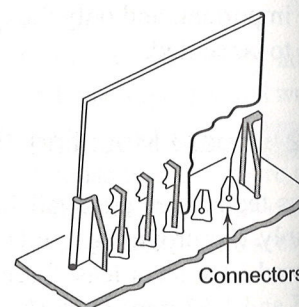
(a) Grooved posts and angle clamps  
The posts serve as guides as the board is lowered to the connector, then the clamps provide positive retention.



(c) Z angle brackets  
Z angle strips can be cut to receive any size board.



(b) Mount on tapped spacers  
Any size board can be accommodated by this simple mounting. It can be a space-saver on walls and doors of enclosures.



(d) Sheet-metal support guides  
Although not positively retained in place, boards are quickly removed and replaced.

**Fig. 3.3** Methods of mounting boards using card guides (a) grooved posts and angle clamps, (b) mount on tapped spacers, (c) z-angle brackets (d) sheet metal support guides (Lindsey, 1985)

If the electrical interface does not require a connector or a card guide is not practical, then mounting holes may be provided on the board so that it can be installed with screws, stand-offs or other mechanical fasteners. However, sufficient clearance should be provided so that components or conductors will not interfere or short-out to the mounting hardware. Adequate clearance